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AUTHOR Silberman, Melvin L.; Allender, Jerome S.
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ABSTRACT

This research determined the viability of three alternative teaching designs which encouraged student involvement and inquiry activity: a) teacher-guided, b) group-planned, and c) individually oriented. Each of the three designs was assigned to two sections of an educational psychology course. The remaining two sections served as a control group. The variables studied were involvement behavior, evaluative attitude toward the course, course impact, and inquiry resolution skill. These variables were measured by the Involvement Behavior Questionnaire (IBQ), Course Description (CD), Inquiry Fluency Task (IFT), and Inquiry Resolution Task (IRT). Results indicated that all three designs were viable alternative teaching methods. Students in the experimental group were consistently superior to the control groups in terms of the variables measured. Minor advantages and disadvantages were uncovered for each design; however, the individually oriented design had the most impressive results. (The appendixes present the IBQ, CD, IFT, and IRT. Fourteen tables of data are also included.) (Author/BRB)

Final Report

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Melvin L. Silberman
Jerome S. Allender
Department of Psychoeducational Processes
Temple University
Philadelphia, Pennsylvania 19122

THE ROLE OF THE TEACHER IN STUDENT-DIRECTED LEARNING

March, 1973

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Office of Education

National Center for Educational Research and Development
(Regional Research Program)

Author's Abstract

The goal of this research was to determine the viability of three alternative teaching designs: (1) Teacher-Guided; (2) Group-Planned; and (3) Individually-Oriented. The first design allows for teacher designed inquiry with openness for student contribution. The second design emphasizes the teacher's facilitation of small group investigation. The third design encourages individual student planning within teacher structured parameters.

The setting of this research was six sections of an undergraduate educational psychology course. Each of the three designs was assigned to two sections of the course. The remaining two sections served as a control group. The variables studied were: involvement behavior, evaluative attitude toward the course, course impact, inquiry fluency, and inquiry resolution skill. These factors were assessed by a group of instruments and tasks, some of which yielded direct quantifiable results and others which allowed for an open-ended student response coded by trained judges.

The results indicate that all three designs are viable options for teachers whose goals are to encourage student involvement and inquiry activity. Students in the three experimental designs were consistently superior to control students in terms of the variables measured. Minor advantages and disadvantages were uncovered for each design. On the whole, the individually-oriented design had the most impressive results.

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CHAPTER I - INTRODUCTION

The Problem and Objectives of the Study

Students throughout the country are demanding the right to share in the determination of what knowledge is worth having. To help in the direction of their own learning is not only a right but is also an educational necessity. Knowledge is constantly growing and changing. As a result, students must develop a competence to inquire for their own purposes. Furthermore, the best condition for learning is a learner's active involvement in his own questions. The concept, however, of student-directed learning creates a challenging educational problem. Since the student's responsibility for learning is radically increased, the role of the teacher is seriously questioned.

Teaching is a complex affair; it involves not only concern for specific instructional techniques but also the design of the classroom environment, the development of instructional materials, the programming of learning experiences, and the building of meaningful relationships with students. Many factors are missed if teaching is conceived at one extreme to be merely a monitoring of prescribed learning tasks or at the other extreme to be solely a matter of making materials and oneself available to students. Moreover, the teacher who believes that students should actively share in the direction of the teaching-learning process faces certain special concerns. First of all, he needs to determine how he can guide his students without inhibiting their sense of self-direction and without interfering with their individual patterns of thinking. And secondly, there is a need to determine what kinds of learning experiences are likely to facilitate the interest of students and at the same time fulfill the teacher's educational values. It is highly improbable that a teacher can find teaching personally meaningful if his own goals, skills, and knowledge did not have a significant role in his relationship with students. Every teacher ought to be responsible to the needs of his students and to his own expectations. With some degree of student direction in mind, it is critical to face the problem of developing plans that are open-ended and flexible so that congruence between the goals of the teacher and those of the students can be achieved.

There is sufficient research and theory to support the notion that the establishment of common meaning between teachers and students is best facilitated when the teacher's leadership in the classroom is democratic and when his relationship with students is on a transactional basis (Lippitt & White, 1943; Getzels & Thelen, 1960; Allender, 1972). Up till now, however, there has been little attempt to specify and evaluate models and designs for a course of study which achieves the goal of allowing for some student direction as well as maintaining an active role for the teacher. Quite likely, a course of study which supports learning by student-directed inquiry and which fosters student involvement should be based on a learning environment which is neither

authoritarian and rigid nor permissive and unstructured. These specifications still allow for a wide variety of approaches that a teacher might take in designing the teaching-learning process. For example, it is not inconsistent with the goal of student-directed learning for the teacher to provide direct guidance at every point in the learning process, so long as the class is allowed an increasing role in the planning and direction of activities. It is also feasible to have students plan a course of study by working in small groups. It is equally possible for the teacher to encourage and support the efforts of individual students to direct the learning experience in terms of their personal choices and needs. The real possibility of chaos supports the need for teacher guidance. The importance of students learning from each other argues for group planning. The need for responsibility and self-reliance suggests the desirability of individual initiative. In order for teachers to determine how to assist students in directing their own learning, we need basic information about the effects of these different emphases. This research is aimed at studying three such designs for the teacher's facilitation of student-directed inquiry.

Our goal is two-fold: (1) to determine the viability of these three designs and (2) to provide information to perspective teachers as to the dynamics which underlie their implementation.

The focus of the research is on an educational psychology course where students direct their own learning, yet the teacher maintains an active planning role. The problem concerns the effect of the teacher's design for student-directed learning. Meaningful evaluation of these designs requires measures that are not typically used in studies of independent learning and individualized instruction. There are two considerations. First, the general assumptions of the proposed program emphasize that personal involvement and inquiry activity are important prerequisites for learning. Second,we are not attempting to decide which method of teaching is best; specific information about the differential effects of different teacher designs is needed. Over time, therefore, process measures which would examine the learning process in detail are preferable to usual product measures which only indirectly explain the differential effects of the designs. The measures used in this study are adaptions from previous research done by the investigators and colleagues on the signs of personal involvement (Silberman, M.L., 1968; Jackson, Silberman & Wolfson, 1969; Silberman, M.L., 1969; Silberman, M.L. & Allender, 1972) and on inquiry activity (Shulman, 1965; Shulman, Loupe & Piper, 1968; Allender, 1968; Allender, 1969a; Allender, 1969b). Student involvement in the three designs was analyzed to determine if equivalent levels are achieved at different points during the program and what, if any, distinguishing aspects of involvement are uncovered. Data were gathered from students' reports of their involvement behavior and from their descriptions of the course program. Inquiry measures were used to study whether the three designs differ in the productivity and quality of cognitive activity of the students who participate in them. Data were collected from tasks which test students' immediate thinking as well as evaluate more sustained inquiry activity. In both sets of involvement and inquiry instruments, one of the pair represents a direct measure, while the other involves an indirect approach to gaining the desired information. With regard to both involvement and inquiry, high scores are generally interpreted as indicative of successful student-directed learning experiences. Comparisons of scores for experimental and control

groups are expected to reveal the relative effects of the different designs.

To summarize, the role of the teacher in the student-directed learning program for an introductory educational psychology course was varied to emphasize teacher guidance, group planning, and individual initiative. The effects of the different orientations were measured in terms of involvement and inquiry activity.

Related Literature

There are several sources of information related to the implementation of student-directed learning including investigations of independent study, individualized instruction, and inquiry processes. Their relevance to the present study is twofold: (1) they suggest guidelines for the design of new programs and (2) they clarify different possible roles available to a teacher.

The concept of independent study was one of the first to challenge the idea that teaching was necessarily a highly structured communication to students. The first independent study programs were planned for college students; the research before the sixties is summarized in two reports (Hatch & Bennet, 1960; Baskin, 1961). In terms of achievement, it was recognized that students in a variety of different programs generally succeeded as well as did students taught more traditionally. Hatch (1963, 1966) reported similar findings and Gruber (1965) added several new conclusions: the results are not limited to intellectually superior students, student reorientation is needed, and small consistent attitude differences result from self-directed study. McKeachie (1963) reported that student-centered teaching was generally related to outcomes beyond the acquisition of knowledge. Trump and Baynham (1961) argued in specific terms for the application of independent study for secondary schools. From the descriptions presented in Beggs and Buffie (1965) and Alexander and Hines (1967), there are now at least a few successful programs at every educational level. A thoughtful overview of independent study presented in a series of papers edited by Gleason (1967) reveals a common assumption about the need for students to exert a controlling influence over some aspects of their learning experience.

The extent of student control is subject to a difference of opinion. Some independent study programs, particularly those in high schools (Alexander & Hines, 1967), are based on the importance of individual differences in learning. The specific learning objectives are determined by the teacher; student control of how he learns is a practical solution to the problem of individual differences. Some of the other programs (reported in Hatch & Richards, 1965; Beggs & Buffie, 1965) presuppose that learning is an active, personal process. The student is expected to involve himself in determining, or helping to determine, his own objectives in addition to choosing how he will learn. In either case, the role of the teacher is deemphasized. In order to advance independent study, the teacher withdraws from directive patterns. Moreover, little attention is given to the relevance of group interaction in independent study; Gruber (1965) argues that "we must give deeper thought to the kind of human relationships

our educational methods foster" (p.9). The difficulty is that there has been a breakdown of the traditional role of the teacher, but new possibilities have not been systematically investigated.

A burgeoning interest in instructional materials (Silberman, H.F., 1962; Pressey, 1964; Lumsdaine, 1964; Parke, 1966; Torkelson & Driscoll, 1968; Briggs, 1968) has contributed practical applications that facilitate independent learning. As one of the investigators has pointed out, instructional materials are essentially an extension of the teacher in the form of recorded communication (Allender, 1967). Thus, they free the teacher from the role of information giving. Learning materials can then be used by the teacher to provide alternative activities through which instruction can be individualized. Hence, the student is free not only from group pacing but also from the necessity of learning by a single sequence and with a single medium. Another contribution of this interest in instructional resources is the impetus it gives to the development of learning centers (Marland, 1963; Congreve, 1964; Krohn, 1964; Cumming, 1967; Hellerich, 1969). The learning center as an alternative to the ordinary classroom is able to make a large variety of instructional materials available on a continuous basis throughout the school day. As a result, it provides a tangible means of creating an educational environment in which the teacher, unneeded for directive instruction, has an active planning role, and the students can pursue learning in terms of their own individual styles.

Although there is little question concerning the importance of individual differences (Henry, 1962), certain aspects of the teacher's role in individualized instruction have been subject to much debate. There is research evidence that learner-controlled use of programed materials promotes achievement gains similar to those obtained when the teacher directs their organization and methods of utilization (Newman, 1957; Mager & Clark, 1963; Campbell,1964; Allen & McDonald, 1966; Campbell & Chapman, 1967). Despite these findings, most programs of individualized instruction prescribe the sequence of learning best suited for the individual needs of the learner. One reason for this practice is a growing conviction that through improved educational technology and teacher training, the practical problems of accomodating individual differences in learning style can be solved by the teacher. As a result, the learner would not need to waste time making the accomodation himself. Jackson (1968) has argued, in this regard, that individualized instruction has been geared more to the economics of learning than its dynamics. Campbell (1964) and Campbell and Chapman (1967) expand this point by arguing that despite the expert's superior knowledge about subject matter and the conditions favoring learning, self-direction allows the student to get more meaning from the learning task as well as promotes self-motivation and evaluation. Nonetheless, the argument against teachers prescribing how the student learns has not been supported by research. Studies attempting to support learner-controlled instruction use little else than achievement criteria and, consequently, do not demonstrate any exclusive educational benefits.

Many investigators are also interested in the contribution of new educational media and materials to the achievement of specific instructional objectives (Mager, 1961; Fry, 1963; Edling, 1968). This development has

had two important effects. It has reinforced the desire for specific instructional strategies, and has assigned to the teacher the role of determining specific learning outcomes. Jourard (1967) maintains, however, that there are important outcomes of education that should not be conceived in terms of specified objectives. To do so, he argues, "reduces variance, diminishes freedom in a sense, and lessens autonomy" (p. 101). Wolfson (1968) joins Jourard in criticizing the belief that behavioral objectives provide the best guidelines for the planning of teaching and learning. She believes that active involvement in learning requires opportunities for students "to ask questions of real concern to them, to make choices and plans, to evaluate and think independently, and to develop individual interests and commitments" (p. 358). To accept this argument, however, requires asking how the teacher can create such opportunities.

Jourard and Wolfson, both, think that it is important for the teacher to enter into a dialogue with the student with the aim of defining educational goals together. They emphasize that such goals need to be open-ended rather than predetermined, and responsive to the learner's questions rather than his deficiencies. This view of education as a joint endeavor of the teacher and the student is shared by most modern critics of education. Axelrod, Freedman, Hatch, Katz, and Sanford (1969) and Schwab (1969), in particular, stress the relevance of this concept to meeting problems of student unrest. The conditions under which this dialogue can occur need to be carefully considered. Some theorists maintain that so long as the teacher clearly defines the extent of his authority and the realm of student decision-making, he can promote open exchanges with students (Withall & Lewis, 1969). In contrast, Morris (1966) argues that the necessary conditions for meaningful education include "no hierarchy of authority in the school, no dominion of teacher over pupil, and no external standards of achievement or success" (p. 153). This debate is far from being resolved.

Research on the teaching of inquiry is also addressed to the problem of giving the teacher an active role in creating opportunities for student-directed learning. Thelen (1960) and Bruner (1961) have maintained that to encourage students' inquiry requires open-ended learning experiences. Recent experimental studies have utilized a variety of such experiences. Suchman (1961, 1962) presented problematic situations involving science concepts in which the range of questions to be asked was left open to the students. Children who participated in this experience increased their question asking by over fifty per cent. In an effort to improve upon Suchman's work, Shulman (1963) introduced the concept of problem sensitivity. He pointed out that the opportunity for the student to sense which problems are critical for himself in a given situation or task is generally missing in research on cognitive processes. This concept places an important constraint on the kind of open-ended experiences the teacher should provide. Problems can be embedded in an activity but must be viewed as problematic by the student in order to elicit his full involvement in learning. Allender (1968) used Shulman's theoretical framework to study the inquiry processes of elementary school children; the materials allowed the children to play the role of a mayor of a small simulated city. Initial use of materials, although programed, could lead to independent inquiries because they permitted

each child to sense his own problems, to select his own questions and to utilize freely a large information file. Moreover, there were no correct solutions. The research has demonstrated that open-ended learning experiences can be used to encourage independent inquiry. This finding suggests that the teacher can facilitate student-directed learning by making educative experiences available.

In summary, some facets of the active role of the teacher in student-directed learning are relatively clear: (1) A variety of instructional materials, preferably housed in a learning center, need to be provided. The materials should include information which pertains to relevant areas of knowledge and responds to individual learning needs. (2) It is important to promote a dialogue with students that leads to a common definition of educational goals. This dialogue can best occur when the student has some decision-making powers. (3) Possibilities for participating in open-ended learning experiences that present engaging problems should be made available. These experiences should be designed so that students can sense their own problems.

Beyond lending support to these general guidelines, though, past investigations have not helped to clarify distinct options for designing a course of study which allows for active student participation. Specific models have been described and evaluated, but typically, the comparison is limited to testing a single experimental approach against a control situation (Trowbridge, 1970; Hall & Steele, 1971). As a result, positive findings can be dismissed by allusion to the Hawthorne Effect. Alternative approaches have not been systematically created and studied so that teachers wishing to involve their students in self-inquiry can have some basis upon which to proceed with their own planning.

In recognition of this need, the current investigators and a colleague conceptualized three models for facilitating student-directed activity: teacher-guided, group-planned, and individually-oriented (Silberman, Allender, & Yanoff, 1972). These options were created to investigate alternative teaching-learning designs which each satisfy the need for active roles for both teachers and students in the learning process. They are based on three themes found in the recent literature on open education and humanistic theories of learning and development. One theme centers on the teacher as a structuring agent of the open classroom (Bruner, 1963; Furth, 1970; Biber et al., 1971). The view is that inquiry can be guided by juxtaposing activities which contain common patterns or principles, and which help to extend the students' interest in an educative direction. The way the teacher structures activity and the decision concerning parameters of the subject matter are seen as critical to the amount and quality of student's information processing. The second theme is based on the role of the peer group in the learning process (Withall & Lewis, 1963; Thelen, 1967; Rogers, 1969; Schmuck & Schmuck, 1971). It is believed that student work groups can facilitate individual learning by allowing a student to formulate his ideas to others as well as learn from the insights of his peers. Successful programs in team learning (Graffam, 1964) and with student-led discussion groups (Beach, 1962, 1965; Leuba, 1965; Webb & Grib, 1967) have helped to demonstrate that learning by individual effort can be enhanced through

group process. The third theme involves a stress on the organic nature of learning and the need for self-reliance (Holt, 1967; Kohl, 1967; Dennison, 1969; Maslow, 1971; Weber, 1971). The central idea here is that students benefit from learning which is initiated by their own questions and organized by their own personal timetable. The teacher's aim is to help the student to work in the classroom in such a way that he finds the way he learns best and the problems that interest him the most.

Of course, these three themes are not mutually exclusive. The development of the teacher-guided, group-planned, and individually-oriented models, however, was designed to emphasize each one of these themes so that their differential effects on students could be studied. Within the framework of the democratic leadership of the classroom, the teacher-guided design is basically conceptualized from the image of the student as an information processer and the teacher as a structurer. The group-planned design is based on the idea that students can learn from and teach each other with the teacher's outside facilitation. The individually-oriented design attempts to promote each student's self-reliant learning with the teacher acting as a resource when needed. The only empirical work with these designs has been at the elementary school level (Yanoff, 1972). The results indicate that all three designs are viable options for the elementary teacher whose goal is to encourage student-involvement and inquiry activity.

CHAPTER II - METHODS AND PROCEDURES

The Setting of the Study

The research is centered on a one semester undergraduate course in educational psychology required of all College of Education students at Temple University (about 1,000 each year). The emphasis of the course is on the dynamics of the teaching-learning process. Typically, the course is taken in the junior year. The classes include a cross-section of college students in terms of backgrounds, age, race, and sex, but as perspective teachers the majority are local, middle-class, young white women. These characteristics, therefore, determine the population to which it will be most appropriate to generalize the results. Students were assigned to sections via the general registration process and no information was available concerning which sections would be taught experimentally. The block of sections chosen to be used in the experiment were randomly assigned to treatments. These two factors rule out the possibility that students were able to select desired treatments and they generally assured the availability of comparable groups.

Two-hundred and fifteen students in eight sections of the course participated in the study. Six sections involved the use of student-directed inquiry procedures. Two of these sections were assigned to each of the experimental treatments. The remaining two sections served as control groups. One section of each experimental treatment was taught by one first-year teaching associate. The other three experimental sections were taught by two full-time faculty members and a second-year teaching associate, each assigned to the treatment of his choice. The two control sections were handled by a full-time faculty member and a third-year teaching associate. Thus, each of the three experimental treatments and the control treatment was replicated once, with two separate instructors assigned to each.

The control groups were engaged in a learning process which was largely teacher-directed. The instructor's role included the responsibility to determine the content of the course, to assign readings, and to grade on the basis of material covered. There was a greater emphasis on surveying the general field of educational psychology in these sections than in the experimental classes. Affective objectives were given low priority by the instructors. At the same time, cognitive objectives were more product-oriented than process-oriented.

The students in all three experimental treatments experienced a course whose special objectives were (1) to involve students in an active way in the planning and direction of the learning process and (2) to facilitate student inquiry activity into major problems concerning the teaching-learning process. These students had equal access to a common set of materials*

*These materials were later published in The Psychology of Open Teaching and Learning: An Inquiry Approach by Melvin L. Silberman, Jerome S. Allender, and Jay M. Yanoff (Eds.). Boston: Little, Brown, 1972.

designed to allow for an inquiry into three basic questions: (1) What should a learning environment provide?; (2) How does the mind work?; (3) What should teachers offer students? The time allotted for investigation into each of these questions was four weeks. In the initial phase of each four-week unit, students had the opportunity to work with tasks which allowed for problem sensitivity, problem formulation, and search for relevant information. After these activities were completed, a second phase was introduced, during which plans were made for the remainder of the four-week unit and then subsequently carried out. All the students in the experimental treatments had access to a learning center which provided space for individual work and small group meetings. The center also contained materials and equipment designed as an additional resource base to the course (e.g., a selected display of current journals, relevant articles, recent books on teaching and learning, 16MM sound films, published recorded lectures and discussions, and commercial instructional materials).

Experimental Treatments

Beyond the availability of a common set of materials and access to the learning center, the experimental treatments were planned to differ in the following respects:

The Teacher-Guided Design

This design mainly involved inquiry activities undertaken by the class as a whole; small group activities and individual projects were used at some points but they were not critical to the process of the course. Reliance on large group activities insured that the instructor had adequate opportunity to give direction, participate, criticize, and make suggestions. Initially, the instructor makes choices for the class from his position of expertise and from his early knowledge of class interests and needs. Midway through the semester, deliberate attempts were made to show students where they could eacily contribute to the planning and direction of activities. Toward the end of the semester, students were encouraged to do more of the planning.

The Group-Planned Design

This design utilized small groups that planned their own inquiry in consultation with the instructor. Each group met on a regular basis as if it were a class, only occasionally meeting with other groups or working on independent projects. Although the instructor gave some direct guidance, he had to divide his time according to the number of groups that were formed during different periods of time. Thus, the group-planning design implied that students came to expect to work regardless of whether the instructor was present.

The Individually-Oriented Design

This design employed a great deal of self-directed, independent study. Students were responsible to a group or class for general planning and reporting of ideas and findings, but the majority of their

energy was concentrated in furthering their personal inquiry. The most active tasks for the instructor were to provide individual consultation and to keep the overall structure of the environment sufficiently organized to minimize the interference that many activities can cause for each other.

Since all three designs had similar goals of encouraging inquiry activity and student involvement, they all allowed for some teacher structuring and guidance, small group activity, and individual initiative. However, the emphases of each design were different in general and along five specific dimensions, namely the role of the teacher, teacher interaction, expectations towards students, nature of the peer group, and type of learning process. In the chart below these differences in emphasis are depicted. It is important in interpreting this chart to understand that the phrases included in each box represent the sub-dimension along which the designs differed the greatest.

Emphases of the Designs

	Teacher-Guided Design	Group-Planned Design	Individually-Oriented Design
General emphasis	teacher designed inquiry with openness for student contribution	facilitation of small group investigation with a focus on group processes	encouragement of individual planning and decision-making within teacher-structured parameters
Role of the teacher	creates overall structure of a unit of study	negotiates group's plans and facilitates group movement	serves as resource person and organizes the learning environment for individual activity
Teacher interaction	content-related messages, used to confront and inform	process interventions to encourage listening, feedback exchange, and perception checking	communications designed to clarify and extend student's meaning
Expectations toward students	expected to process experiences created by teacher into some personal state of resolution	expected to work with and learn from peers	expected to rely on self and to be aware of own direction

(continued)

Emphases of the Designs (continued)

	Teacher-Guided Design	Group-Planned Design	Individually-Oriented Design
Nature of the peer group	mobilized and organized frequently by the teacher for singular activities; usually formed on the basis of friendship	a stable, on-going unit designed to achieve intense relationships; usually formed by combining people who work well together	an available source of common activity for individual students usually formed on the basis of interest
Type of learning process	guided discovery; structured information processing	peer teaching; group investigation	self-directed; informal and organic

To help insure that different instructors had similar interpretations of the treatment design to which they were assigned, pilot runs of the treatments were conducted during the semester previous to the actual study. Several meetings were held in which the systematic notes of two trained observers who collected data from all the pilot classes were reviewed. Discrepancies in interpretation and actual behavior between different instructors assigned to a common treatment design were identified and discussed until common agreement was reached. At the same time, the observational data was scrutinized to determine whether serious overlaps existed in the interpretation and execution of different treatment designs and a similar process was used to resolve discrepancies.

The observational data collected during this pilot state contained information about the following differences in the treatment designs:

Teacher-Guided Design: This design seemed to allow for greater confrontation by the teacher, that is, a greater likelihood that the teacher would be the source of discrepant cognitive information or viewpoint. The activities provided in the course materials for exploring both intellectually and experientially certain concepts tended to be better designed and executed for classroom use. There was also a greater coverage of topics of study and a tendency for more uniform activity in class.

Group-Planned Design: Here, there seemed to be greater emphasis on the planning of activities to take place in class than in the other treatments, with more alternatives in terms of goals and activity

strategies considered. It was also observed that the greatest amount of teacher intervention into group activity occurred. In general, the class atmosphere was more intense than in other designs.

Individually-Oriented Design: In this design, there was a tendency of activities to be planned poorly. On the other hand, there was more informality among students when the activities were carried out. Also, the instructors tended to provide a far greater range of suggestions as to activity choices which could take place than in the other designs.

Measures

Two instruments were used to assess student involvement; the Involvement Behavior Questionnaire and the Course Description. The former is a paper and pencil questionnaire which yields direct quantifiable results. It focuses on behaviors students exhibit which indicate involvement. The latter instrument requires an open-ended student response, the content of which is rated to yield scores. The findings derived from it reflect feelings students express which indicate involvement.

The Involvement Behavior Questionnaire (IBQ)

The instrument (found in Appendix I) is a nine-item questionnaire in which the student reports the absence of/or presence of particular behaviors indicative of student involvement. It was administered four times during the semester (week 6,8,10 and 12). The instrument contains three questions which refer to involvement prior to coming to class, three which refer to involvement during class, and three questions which refer to involvement after class. Student responses to each involvement behavior are limited to leaving the item blank, checking the response YES?, YES, or a YES! A value of 3 is given to a response of YES!, a value of 2 to YES, a value of 1 to YES?, and a value of 0 to no response. Two kinds of scores are derived from the instrument; a score for the total scale and scores for each sub-scale ("pre-class," "in-class," and "post-class" involvement behavior).

Course Description (CD)

This instrument (found in Appendix II) is a semi-projective task which assesses the student's evaluative attitude towards the course and the extent of its impact on him. The task asks the subject to imagine that a friend would like to know what the course has been like for the student. Students were requested to spend about 15 minutes writing their response. The task was completed by the students twice during the semester (weeks 5 and 11).

Two scores were derived by content analysis of the course descriptions; "evaluative tone" and "impact." Evaluative tone signifies the predominant value (positive or negative) and intensity of evaluative

remarks made about the course. The score is based on the sum of positive and negative evaluative statements in the description with positive statements receiving the value of +1 and negative statements -1. Descriptive data on the number of evaluative statements, as well as the number of positive and number of negative statements separately, were also recorded. The scoring of the course description for evaluative tone was done by four judges, each rating 25% of all the protocols. Protocols scored by each judge were randomly selected from the entire sample. The name and section of the student on each protocol was unknown to the scorer. Inter-judge agreement on pilot data for evaluative tone was 89%. In addition, a fifth judge scoring blindly, agreed 87% of the time with the actual scoring on a sample of 50 pilot protocols covering each scorer and section. Impact is defined by the extent to which the student indicates in his description that the course had meant or done something to him personally. Each description was rated in terms of impact on a four point scale, using the following rating criteria: (1) no indication of impact; (2) no impact directly reported but can be inferred from student's remarks; (3) brief remarks describing direct impact; and (4) sustained remarks describing direct impact. Inter-judge agreement on pilot data for impact was 84% and the reliability check described previously produced 85% agreement.

Two kinds of instruments were utilized to assess inquiry activity; the Inquiry Fluency Task and the Inquiry Resolution Task. The former is an in-class activity which yields direct quantifiable results, while the latter is an open-ended activity done at home. Both tasks relate to problems and issues about the teaching-learning process, but only the Inquiry Resolution Task is specifically related to the course content.

The Inquiry Fluency Task (IFT)

The purpose of the IFT is to determine the fluency of such inquiry behaviors as problem sensing, problem formulation, search and idea generation. The instructions for these tasks (found in Appendix III) are designed to elicit student response to films from the Critical Moments in Teaching Series (Holt, Rinehart, and Winston, Inc.). These films each present a problematic situation in the teaching-learning process and terminate at a critical point in the dramatic portrayal of the situation. Students are requested to list the (1) problematic events and (2) the general issues they sense in the films as well as (3) the literature to which the film applies and (4) the teaching ideas they can generate to deal with the problem situation. These responses are solicited under the guise that the student is being asked to plan a discussion of the films for the rest of his class. The score for each student on each task was equivalent to the sum of responses he made to all four categories above. The first IFT was administered during week 6 and the second IFT during week 10. At each administration, a different film from the Critical Moments in Teaching Series was used as the stimulus.

The content of each film is appropriate for use in educational psychology courses. All instructors agreed that neither film presented a situation better geared to the content of either the control or experimental classes.

The Inquiry Resolution Task (IRT)

This task (found in Appendix IV) was constructed to assess the quality of sustained inquiry activity. It served as a take-home examination for students assigned to the experimental treatments. Since this task was designed to measure the differential effects of the three experimental models on content-specific performance, it was not administered to students in the control classes. The task tests a student's ability to bring to a meaningful resolution the concepts and experiences he encountered during his inquiry in the course. The task was given out during week 9 and obtained from students during week 12 of the semester.

The IRT was scored on a four point rating scale. The ratings reflect the adequacy of the process engaged in by the subject and the product developed. The rating criteria were as follows: (1) little attempt at formulation of problems inherent in the task and little awareness of relevant theoretical considerations; (2) some attempt at formulation of problems inherent in the task but little awareness of relevant theoretical considerations; (3) an organized formulation of problems inherent in the task but limited grasp of relevant theoretical considerations; and (4) an organized formulation of problems inherent in the task and good insight into relevant theoretical considerations. The scoring of the IRT was done by four judges, each rating 25% of all the protocols. Protocols scored by each judge were randomly selected from the entire sample. The name and section of the student on each protocol was unknown to the scorer. Inter-judge agreement on pilot data for the IRT was 86%.

Time Schedule for Data Collection

All data was collected from the fifth week to the last week of the semester. Data collection was delayed until the fifth week in order to allow each treatment to become stable. In order to receive concrete reports of student behavior, the Involvement Behavior Questionnaire was administered every two weeks. In terms of the course schedule, the IBQ was given during the second and fourth weeks of two four-week units of study. This allowed for assessing involvement behavior as a unit of study got underway and when it was reaching completion. The Course Description and Inquiry Fluency Task was administered twice during the data collection period since we were interested in how the perceptions and skills they tap change over time. Below is a summary of the times each instrument was administered.

Data Collection Schedule

Measures*

Unit of Study	Week	Involvement	Inquiry
second	5	CD	
	6	IBQ	IFT
	7		
	8	IBQ	
third	9		
	10	IBQ	IFT
	11	CD	
	12	IBQ	IRT

* IBQ = Involvement Behavior Questionnaire
CD = Course Description
IFT = Inquiry Fluency Task
IRT = Inquiry Resolution Task

Data Analysis

Since the differential effects of the three experimental designs and control treatment are unknown, the data analysis was initially based on the use of analysis of variance. When a particular analysis of variance indicated treatment effects, post-hoc mean comparisons among groups were conducted. Duncan's New Multiple Range Test was employed for this purpose. For all instruments which were repeated, the analysis of variance was two-way, with the effect of repetition (hereafter, called the time effect) as a factor in the analysis. Thus, the stability and increase in scores on any given instrument could be analyzed. When analysis of variance with repeated measures was conducted, the simple main effects (treatment and time) were not analyzed until the interaction mean square was found to be significant.

CHAPTER III - THE RESULTS

Student Involvement

1. Involvement Behavior Questionnaire (IBQ)

With regard to the IBQ scores, there are two potential sources of variation of interest to this study; time differences and treatment differences. When the time of the administration of the IBQ significantly affects the distribution of scores for any given treatment group, we can say that the level of involvement of that group is not stable over time. When the treatment group significantly affects the distribution of scores for each administration of the IBQ, we have evidence that some group differences exist in involvement behavior at any given time. As indicated in the previous section, an analysis of variance with repeated measures was employed for this purpose. Table I shows the results of this analysis for the IBQ.

TABLE I

F Ratios for 2 Sources of Variation --
Total Scale - Involvement Behavior Questionnaire

Sources of Variation	F Ratios			
	Individually-Oriented	Group-Planned	Teacher-Guided	Control
Time	3.08*	4.90*	10.40*	2.57
	IBQI	IBQII	IBQIII	IBQIV
Treatment	14.97*	16.76*	12.33*	13.48*

* Significant at the .05 level

Table I indicates that there is a significant time effect on the total scale scores of the IBQ for all three experimental groups (but not for the Control group). In other words, involvement behavior fluctuates over time in the experimental group while remaining rather stable in the Control group. The Teacher-Guided group appears to have the greatest fluctuation over time. These results can be seen

graphically in Figure 1. Table 1 also indicates that there is a significant treatment effect on the total scale scores for each administration of the IBQ. Thus, for every administration of the IBQ, some group differences exist. Table 2, which summarizes the mean scores and standard deviations for the total scale of the IBQ, provides for a comparison of the descriptive statistics for each group.

FIGURE 1

Involvement Behavior Questionnaire Over Time

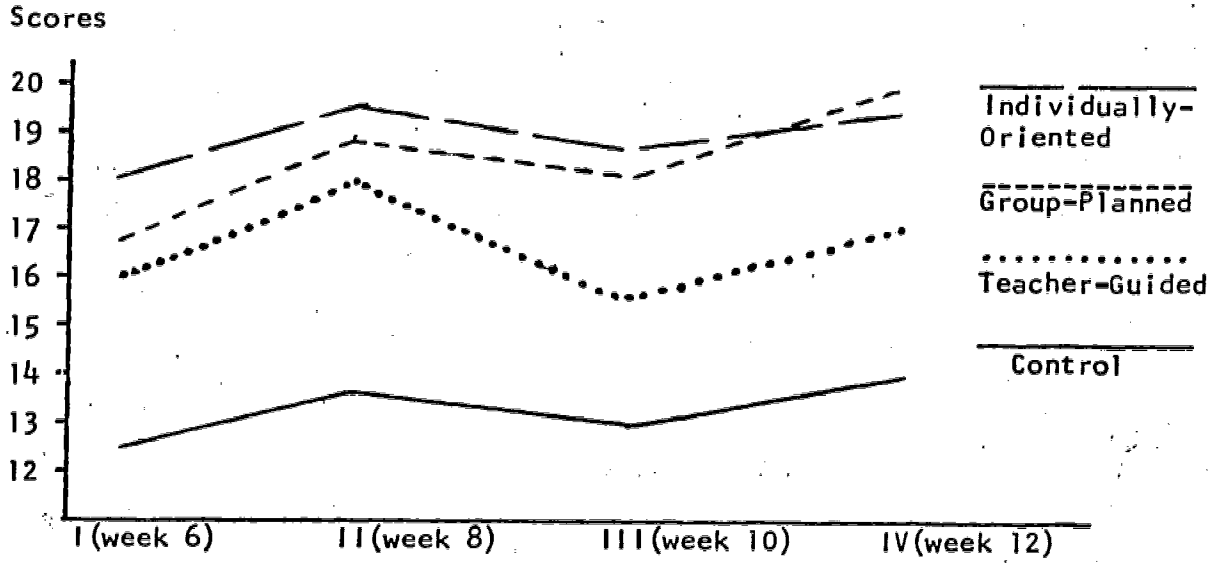

TABLE 2

Summary of Mean Scores and Standard Deviations -- Total Scale - Involvement Behavior Questionnaire

	IBQ I		IBQ II		IBQ III		IBQ IV	
Group	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Individually-Oriented	17.9	4.1	19.6	3.4	18.1	4.7	19.0	3.9
Group-Planned	17.2	4.1	18.6	4.5	17.4	4.6	19.2	4.6
Teacher-Guided	16.3	4.4	18.1	4.2	14.8	5.2	17.3	4.7
Control	12.2	5.3	13.6	4.9	13.2	6.4	14.0	5.9

The results from the analysis of variance allow for proceeding with post-hoc comparisons of group means, using Duncan's New Multiple Range Test. Table 3 contains the results of these comparisons. It indicates that there are no significant differences among the experimental groups with the exception of the third administration of the IBQ (week 10). Furthermore, the Control group means are significantly lower than those of the experimental groups, with the exception of IBQ III. Here, it appears that the Teacher-Guided group appreciably drops in involvement behavior such that the difference between it and the Control group is not significant.

TABLE 3

Duncan's New Multiple Range Test Applied to the Differences Between Group Means on the Involvement Behavior Questionnaire

Comparisons	IBQ I	IBQ II	IBQ III	IBQ IV
IO vs C	5.7*	6.0*	4.9*	5.0*
GP vs C	5.0*	5.0*	4.2*	5.2*
TG vs C	4.1*	4.5*	1.6	3.3*
IO vs GP	0.7	1.0	0.7	-0.2
IO vs TG	1.6	1.5	3.3*	1.7
GP vs TG	0.9	0.5	2.6*	1.9

Key: IO = Individually-Oriented
GP = Group-Planned
TG = Teacher-Guided
C = Control

*Significant at the .05 level

Further interpretation of the IBQ results can be gained by examining the sub-scale scores for each administration of the IBQ. Table 4 summarizes the mean scores for each sub-scale. The data suggest that the level of "in-class involvement" in the Teacher-Guided group is comparable to the other experimental groups but "pre-class and post-class involvement" is somewhat lower. Interestingly, the Control group fares better in terms of "post-class involvement" than on the other two sub-scales.

(Table 4 follows)

TABLE 4

Summary of Mean Scores --
Sub-Scales - Involvement Behavior Questionnaire

Group	Pre-Class Involvement				In-Class Involvement				Post-Class Involvement			
	I	II	III	IV	I	II	III	IV	I	II	III	IV
Individually-Oriented	5.6	6.2	5.8	6.4	6.3	6.7	5.9	6.2	6.8	6.6	6.2	5.3
Group-Planned	5.2	5.8	5.4	6.3	6.3	6.3	5.4	6.4	6.0	5.7	5.2	4.6
Teacher-Guided	4.8	5.3	4.7	5.5	6.3	6.6	4.5	5.9	6.2	5.6	4.6	4.7
Control	3.7	3.6	3.8	4.0	4.0	4.6	4.6	4.1	6.2	6.0	5.4	5.2

In summary, it appears that the three teaching-learning designs under investigation are equally viable with regard to involvement behaviors depicted on the IBQ. The experimental groups consistently differ statistically from the Control group, at the same time as they do not significantly differ among themselves. The data also suggests that the Teacher-Guided group, while not meaningfully different from the other experimental groups, has somewhat different dynamics. Specifically, it appears to have the least stability in involvement behavior, and a different profile of strengths and weaknesses.

II. Course Description (CD)

Several sub-scores are derived from the Course Description: evaluative tone, frequency of evaluative statements, frequency of positive statements, frequency of negative statements, and impact. The use of analysis of variance with repeated measures allows us to test for (1) increase over time on any of these scores for each treatment group and (2) group differences on each score for both administrations of the Course Description.. Results of the analysis are reported in Table 5.

(Table 5 follows)

TABLE 5

F Ratios for 2 Sources of Variation - Course Description

	Eval. Tone	Number of Evaluative Statements	Number of Positive Statements	Number of Negative Statements	Impact
Source of Variation - Time					
IO	1.56	3.83*	5.38*	.25	1.84
GP	.93	10.47*	6.48*	2.28*	1.42
TG	4.43*	4.82*	6.71*	.02	.72
C	1.05	.40	1.03	.25	.02
Source of Variation - Treatment					
CDI	20.99*	4.81*	17.21*	6.71*	15.66*
CDII	24.51*	10.98*	26.61*	4.53*	23.12*

Key: IO = Individually-Oriented
GP = Group-Planned
TG = Teacher-Guided
C = Control

*Significant at the .05 level

With regard to the effect of time, we found a significant change from CDI to CDII on (1) evaluative tone for the Teacher-Guided group, (2) frequency of negative statements for the Group-Planned treatment and (3) frequency of evaluative statements and positive statements for all three experimental groups. There is no significant increase on impact over time, however, for any groups. Table 5 also indicates that there are significant group differences on all scores derived from each administration of the Course Description.

Table 6 summarizes the mean scores and standard deviations for the evaluative tone scores and the frequency of evaluative statements, positive statements, and negative statements on CDI and CDII. Again, the Control group consistently has the lowest mean scores. The Group-Planned treatment lags behind the other two experimental groups on evaluative tone on both administrations of the Course Description. The reason for this lag is different, however, at each time. On CDI, students in the Group-Planned treatment make less evaluative statements, both positive and negative. In essence, their evaluative attitude toward the course by week 5 is more neutral than the other experimental groups. On CDII, though, Group-Planned students make as many evaluative statements about the course, but they are less positive and more negative than those of the other experimental groups.

TABLE 6

Summary of Mean Scores and Standard Deviations --
Evaluative Attitude Toward Course

Score	Course Description I		Course Description II	
	Mean	S.D.	Mean	S.D.
Evaluative Tone				
IO	3.0	3.2	3.7	3.5
GP	2.2	3.9	2.7	4.2
TG	2.7	3.0	3.8	3.1
C	-0.5	3.4	0.1	3.5
# of Eval. Statements				
IO	4.4	2.7	5.3	2.9
GP	3.7	3.3	5.2	3.5
TG	4.3	2.9	5.3	2.9
C	3.0	2.8	3.3	2.0
# of Positive Statements				
IO	3.6	2.7	4.3	2.9
GP	2.9	3.3	3.9	3.7
TG	3.5	2.6	4.5	3.1
C	1.3	1.3	1.7	1.5
# of Negative Statements				
IO	0.7	1.2	0.7	1.4
GP	0.3	1.6	1.1	2.3
TG	0.6	1.5	0.7	1.3
C	1.7	2.9	1.4	2.3

Kay: IO = Individually-Oriented
GP = Group-Planned
TG = Teacher-Guided
C = Control

Table 7 summarizes the mean impact scores and standard deviations of CDI and CDII, while Table 8 provides the percentage distribution of impact ratings. The Control group has the lowest means and standard deviations. In over 80% of both course descriptions of the Control group, there was no evidence of impact. Similar to the results of the IBQ, the Teacher-Guided group lags slightly behind the other two experimental groups on impact. Particularly interesting is the fact that a sustained impact message is found in only 3% of the final course descriptions of students in this group. Finally, a comparison between the Individually-Oriented and Group-Planned treatments reveals little difference in impact rating on both CDI

and CDII; however, the former group has less students whose course descriptions received the lowest rating and more students whose descriptions received the highest rating than in the latter group.

TABLE 7

Summary of Means and Standard Deviations -- Impact

	Course Description I		Course Description II	
Group	Mean	S.D.	Mean	S.D.
Individually-Oriented	2.0	1.1	2.2	1.1
Group-Planned	1.8	0.9	1.9	1.2
Teacher-Guided	1.7	0.8	1.7	0.9
Control	1.2	0.6	1.2	0.6

TABLE 8

Percentage Distribution of Impact Ratings

	Course Description I				Course Description II			
Group	Rating =1	Rating =2	Rating =3	Rating =4	Rating =1	Rating =2	Rating =3	Rating =4
Individually-Oriented	41%	23%	21%	14%	30%	32%	19%	19%
Group-Planned	47%	33%	16%	3%	44%	29%	11%	16%
Teacher-Guided	50%	30%	20%	0%	45%	32%	20%	3%
Control	89%	6%	2%	2%	83%	13%	4%	0%

Table 9 contains the results of post-hoc group mean comparisons yielded by the Multiple Range Test. On CDI there are no significant differences among the experimental groups. Moreover, their mean scores are all significantly higher than those on the Control group. On CDII, there is some breakdown in the pattern found in CDI. The Group-Planned treatment is not significantly different from the Control group in terms of the frequency of negative statements. Also, the Teacher-Guided group has a significantly lower mean impact score than the Individually-Oriented group.

TABLE 9

Duncan's New Multiple Range Test Applied to the Differences Between Group Means on the Course Description

	IO vs Control	GP vs Control	TG vs Control	IO vs GP	IO vs TG	GP vs TG
CD I						
Eval. tone	3.5*	1.7*	3.2*	0.8	0.3	-0.5
# of eval. state.	1.4*	0.7*	1.3*	0.7	0.1	-0.6
# of positive stat.	2.3*	1.6*	2.2*	0.7	0.1	-0.6
# of negative stat.	-1.0*	-1.4*	-1.1*	0.4	0.1	-0.3
Impact	0.8*	0.6*	0.5*	0.2	0.3	0.1
CD II						
Eval. tone	3.6*	2.6*	3.7*	1.0	-0.1	-0.9
# of eval. stat..	2.0*	1.9*	2.0*	0.1	0.0	-0.1
# of positive stat..	2.6*	2.2*	2.8*	0.4	-0.2	-0.6
# of negative stat.	-0.7*	-0.3*	-0.7*	-0.4	0.0	0.4
Impact	1.0*	0.7*	0.5*	0.3	0.5*	0.2

Key: IO = Individually-Oriented
GP = Group-Planned
TG = Teacher-Guided
C = Control

*Significant at the .05 level

In general, then, it appears that the three teaching-learning designs are equally viable with regard to student involvement data derived from the Course Description. A closer look at the data, though, reveals two small areas of difference: (1) the data on student's evaluative attitude toward the course is somewhat more

shaky concerning the Group-Planned treatment than for the other two experimental groups; (2) the data on the course's impact is somewhat weaker for students in the Teacher-Guided treatment than for students in the other two experimental groups.

III. Summary - Student Involvement Data

Taking the results of the IBQ and CD together, a distinct trend appears for all three experimental groups. The Individually-Oriented group is strong along every dimension of student involvement that was measured. The Group-Planned treatment is consistently strong in terms of student's actual involvement behavior but vacillates in terms of evaluative feelings toward the course. The data for the Teacher-Guided group has, in some respects, a trend opposite of that of the Group-Planned treatment. Teacher-Guided students are stronger in their verbal expression of satisfaction with the course than they are in their behavioral expression of involvement. Despite these different trends, however, there is a commonality among the experimental treatments with respect to the encouragement of student involvement. All three designs gain involvement more effectively than a more standard approach to the course.

Inquiry Activity

I. Inquiry Fluency Task (IFT)

Analysis of variance with repeated measures was also used to test for treatment and time effects on the IFT. Table 10 shows the results of these analyses. There is a significant time effect for both administrations of the instrument. In other words, there is a significant change over time in the fluency of inquiry behaviors for the experimental groups but no corresponding change for the Control group; furthermore, the distribution of scores for each IFT is significantly affected by the group treatment.

TABLE 10

F Ratios for 2 Sources of Variation -- Inquiry Fluency Task Scores

Sources of Variation	Individually-Oriented	Group-Planned	Teacher-Guided	Control
Time	10.45*	3.74*	5.56*	1.67
	IBT I		IBT II	
Treatment	10.20*		20.10*	

*Significant at the .05 level

Table 11 summarizes the mean scores and standard deviations for the first and second administrations of the IFT. The Control group has the lowest mean scores on both tasks and the least increase over time. The Teacher-Guided group lags behind the other two experimental groups at each administration. The Individually-Oriented group has the highest mean scores.

TABLE 11

Summary of Mean Scores and Standard Deviations -- Inquiry Fluency Task

	IFT I		IFT II	
Group	Mean	S.D.	Mean	S.D.
Individually-Oriented	12.6	6.1	17.4	7.9
Group-Planned	10.7	4.3	13.5	6.6
Teacher-Guided	8.3	3.9	11.6	5.6
Control	7.0	5.1	8.9	6.0

Table 12 provides results of post-hoc group mean comparisons yielded by The Multiple Range Test. The Individually-Oriented group mean is significantly higher than the Teacher-Guided and Control group means on both IFT I and IFT II and is also significantly higher than the Group-Planned treatment on IFT II. The Group-Planned mean, in turn, is significantly higher than the Teacher-Guided and Control means on IFT I and the Control mean on IFT II. The Teacher-Guided mean on IFT I is not significantly higher than the Control mean but reaches a signficant difference level on IFT II.

TABLE 12

Duncan's New Multiple Range Test Applied to the Differences Between Group Means on the Inquiry Fluency Task

	IO vs C	GP vs C	TG vs C	IO vs GP	IO vs TG	GP vs TG
IFT I	5.6*	3.7*	1.3	1.9	4.3*	2.4*
IFT II	8.5*	4.6*	2.7*	3.9*	5.8*	1.9

Key: IO = Individually-Oriented
GP = Group-Planned
TG = Teacher-Guided
C = Control

*Significant at the .05 level

In summary, it appears that all three teaching-learning designs under investigation significantly affect the development of cognitive fluency. Problem sensing and ideational fluency improves over time in all three experimental groups (while the fluency level is unchanged in the Control group). Furthermore, by the end of the course, every experimental group mean is significantly higher than the Control group mean. In contrast to the involvement instruments (IBQ and CD), the IFT also discriminates among the experimental groups to a considerable degree. This is the first indication that the three designs have a significant differential effect.

II. Inquiry Resolution Task (IRT)

The ratings derived from the Inquiry Resolution Task were subjected to a one-way analysis of variance. The result (F=4.77) indicates that the three experimental designs have a differential effect on the inquiry skills assessed by the IRT. The findings of Duncan's New Multiple Range Test are contained in Table 13. They provide evidence that the Group-Planned treatment is significantly lower on the IRT than are the Individually-Oriented and Teacher-Guided groups.

TABLE 13

Duncan's New Multiple Range Test Applied to the Differences Between Group Means on the Inquiry Resolution Task

	Comparisons		
	IO vs GP	IO vs TG	GP vs TG
	0.5*	0.1	-0.4*

Key: IO = Individually-Oriented
GP = Group-Planned
TG = Teacher-Guided

*Significant at the .05 level

Table 14 indicates the percentage distribution of ratings on the IRT. While all three groups have roughly the same percentage of students who receive the poorest rating, only 24% of the students in the Group-Planned treatment receive a rating of 3 or 4 as compared to 48% and 41% for the Individually-Oriented and Teacher-Guided group. Also of note is the finding that more Individually-Oriented students receive the highest IRT rating than do Teacher-Guided students (17% vs. 8%).

(Table 14 follows)

TABLE 14

Percentage Distribution of IRT Ratings

Group	Ratings 1	2	3	4
Individually-Oriented	33%	19%	31%	17%
Group-Planned	34%	41%	22%	2%
Teacher-Guided	36%	22%	33%	8%

III. Summary - Inquiry Data

Taking the results of the IFT and IRT together, a distinct trend appears for each experimental group (as it did with the IBQ and CD results). The Individually-Oriented group is strong along both dimensions of inquiry activity that were measured. This consistent strength, it should be recalled, was evident on the involvement measures as well. The Group-Planned treatment is strong on cognitive fluency (IFT) but on a task measuring sustained content-related inquiry activity (IRT), it is somewhat weak. The IRT requires an ability to generate and evaluate a personal solution to a content-related problem. This skill is apparently not as well developed in this group as the ability to merely play with ideas (as required in the IFT). The Teacher-Guided group, on the other hand, is not as strong on cognitive fluency as the other two groups but performs well on the sustained content-related inquiry task.

CHAPTER IV - DISCUSSION OF THE RESULTS

Two major findings have emerged from this study. First, substantially different designs for teaching and learning are viable for promoting student involvement and inquiry activity. Second, the designs under investigation meaningfully differ in terms of the consistency of student behavior they evoke, although no one design is clearly superior. As each one of these findings has its own significance, each is separately discussed before any consideration is given to their collective implications.

I. The viability of the three teaching-learning designs has been assessed in this study by contrasting them with a control situation in which student involvement and inquiry activity are not major objectives. Thus, the assessment is based on the extent to which student involvement and inquiry activity are promoted when no meaningful effort is made to achieve these ends during a course of study. A review of the data from control classes substantiates that these ends are not attained without a teaching design planned with them in view.

The data from the total scale of the Involvement Behavior Questionnaire indicates that the Control group means are significantly lower than the experimental group means on three of four administrations. Only on the third administration does the Control group not differ significantly, and, in this instance, just from one of the experimental groups (Teacher-Guided). Moreover, on two of three sub-scales of the IBQ, the Control group is lower than the experimental groups. The only sub-scale on which the Control group does not appreciably differ is the "post-class involvement." One reason for this exception may be that control students become involved with in-between class assignments, although this involvement is not continued when they come back to class. The total scale and sub-scale scores of the Control group are also more stable over time. Thus, it appears that the initial level of involvement behavior does not increase in the control classes as the semester goes along.

The data from the Course Description (CD) on the Control group is consistent with the above results of the IBQ. On all the scores derived from CD, the Control group is significantly lower than the experimental groups, with the one exception that group-planned students are as negative as control students on CD II. The students in this group infuse their description with few evaluative statements and those they do make contain equal numbers of positive and negative comments. Only 4% of the Control group focused on themselves in relationship to the course in either course description. The Control group scores derived from the Course Description were also highly stable over time. Little increase in satisfaction with the course and expression of course impact was evidenced.

Control students' lack of involvement also extends to the cognitive domain. Results on the Inquiry Fluency Task (IFT) show that the Control group consistently has the lowest score. Once again, its scores did not increase over time. The IFT appeared to create much difficulty for control students. The passivity encouraged in their course of study seemed to affect the ideational fluency they could achieve in response to the stimulus films used in these tasks.

II. The differential dynamics and effects of the three teaching-learning designs can best be seen by a review of the data for each treatment. In relationship to the other two groups, the results derived from the involvement instruments (IBQ and CD) for the Teacher-Guided group suggest a somewhat weaker pattern of student engagement in the learning process. The sub-scales of the IBQ indicate, for example, that teacher-guided students are highly involved during class time, but their state of involvement is not as high upon coming to class or after class. This finding suggests that involvement for these students is, to some extent, dependent upon direct teacher stimulation. In addition, involvement behavior in this group is subject to greater fluctuation than in the other groups. This instability can be seen in the large drop in total scale mean score from IBQ II to IBQ III. IBQ III was administered at the beginning of a new unit of study. This drop, therefore, suggests that the involvement level of students is more influenced by the course structure in the Teacher-Guided group than in the other groups. The IBQ data for this group is reinforced by the results on impact derived from the Course Description. Only 23% of the teacher-guided students had more than inferred impact statements in their descriptions.

Despite these findings, however, teacher-guided students were enthusiastic about the course. Over the semester, they made more positive statements and less negative statements about the course than did students in the other two groups. This group,also, is the only one that significantly increases in evaluative tone from CD I to CD II. The discrepancy between evaluative tone and impact data is not easily explainable. An impressionistic analysis of the course descriptions of this group reveals a tendency to discuss the course as something external to the student (e.g., It's an enjoyable course.") rather than to talk about its significance for him (e.g., "I really became aware in this course that I must be the ultimate evaluator of my own learning."). This tendency suggests that the course is not as personally confronting for these students as it is for students in other groups, even though their instructor more frequently confronts students intellectually during class than does the teacher in other treatments.

The data on inquiry activity for teacher-guided students indicates a disparity similar to that found in the involvement data. The Teacher-Guided group does not perform impressively on the IFT but does well on the IRT. This discrepancy might be explained by the following logic. Since the Teacher-Guided design emphasizes structured activities to facilitate information processing, students in this design find it easier to organize sustained inquiry activity related to the content of the course. When it comes to information processing tasks (such as

the IFT) which are only indirectly related to course content and which are less structured, teacher-guided students experience some difficulty.

The involvement data for the Group-Planned treatment reveal interesting clues toward an understanding of the process dynamics of this design. Involvement behaviors assessed by the IBQ are well evidenced in this group. Furthermore, this group is the only one of the three experimental treatments which is stronger on the IBQ at the end of the semester than at other points in time (refer to Figure 1). This finding suggests that the Group-Planned approach takes more time to generate maximum effect (involvement-wise) than do the other two designs. The sub-scale means provide another interesting finding. Students in this group are stronger on the in-class sub-scale than on the other two sub-scales. This is an indication that student involvement is particularly intense in a stable student work group atmosphere.

The data on impact for the Group-Planned design reinforces the findings of high involvement derived from the IBQ. Nonetheless, group-planned students are less overtly enthusiastic about the course than the involvement data from the Involvement Behavior Questionnaire and impact scores on the Course Description might suggest. Besides the fact that their evaluative tone scores are lower than students' in the other experimental groups, group-planned students are alone in making more negative statements at the end of the course than at the half-way point in the semester. From an analysis of the course descriptions, this finding seems to reflect the increasing annoyance with teacher intervention into student group activity.

On-going student-directed groups also seem to affect performance on tasks which require individual resolutions. While students in the Group-Planned treatment performed well on the IFT (I and II), they did not perform as effectively on the IRT. It seems that an instructor in this design is more helpful in encouraging ideational fluency and problem analysis than generation of solution.

Overall, the Individually-Oriented design has the most consistent and strongest results. Data from the IBQ reflects the high degree of involvement evidenced by students in this group. Particularly noteworthy is their profile of sub-scale mean scores. The critical difference on the IBQ between the Individually-Oriented design and the other designs lies with the pre-class and post-class sub-scales. Apparently, individually-oriented students are more likely to be involved with the course when not in face-to-face contact with other students and the instructor than are teacher-guided and group-planned students. This indication of intense involvement behavior is corroborated by students' statements of impact on the Course Description. By the semester's end, 38% of the Individually-Oriented group specified and elaborated on concrete points of impact that the course had for them. This fact is impressive when one considers that most students' course descriptions were confined to mere depiction of the course content and to externalized perceptions of the course's value. Significantly, the

high degree of involvement reported by individually-oriented students is also accompanied by frequent expression of positive comments with the course itself.

The inquiring behavior of individually-oriented students is also impressive. Their performance on the IFT represents an instance of clear superiority. Ideational fluency appears to be greatly enhanced by a teacher who stresses self-reliant learning. At the same time, individually-oriented students, for the most part, proved quite capable of integrating course content into effective personal resolutions on the IRT even though they receive less direct, content-related stimulation from their instructors and peers.

III. The findings of this study ought to have particular relevance to the college instructor who wishes to promote student involvement and inquiry activity. This research indicates to him that such objectives are not automatic by-products of any well-organized course of study with competent instruction. Rather, it appears necessary to create specific plans for energizing student involvement and inquiry activity. On the other hand, it is possible to utilize alternative approaches in teacher styles, teacher-student interaction,and peer group activity to achieve these ends.

The data does suggest minor advantages and disadvantages to the three teaching-learning designs that were investigated. For example, involvement behavior is somewhat weaker in the Teacher-Guided design. Yet, for an instructor who wants to invite a positive feeling in students and who wants consistently good results from content-related tasks, the Teacher-Guided design might be an appropriate choice. Similar balancing considerations might be used to base a preference for either of the other two designs. Of course, additional viable designs might be created by interweaving the ones presented in this study. For instance, a teaching plan might be devised in which different stages of a single unit of study would have a teacher-guided, group-planned, or individual orientation. Another possibility would be to gradually change the design over the course of a semester. Offering two or three designs at the same time might also be feasible. Students could choose the mode of student direction that best meets their needs. The viability of any of these combinations is still untested by systematic evaluation, but the results of this study suggest that experimentation along these lines could be productive. In the last analysis, regardless of the design that is chosen or created, it should support and facilitate the instructor's needs and the needs of his students.

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APPENDICES I - IV

APPENDIX I

INVOLVEMENT BEHAVIOR QUESTIONNAIRE

This questionnaire is designed to gather information about what has been happening to you in the course DURING THE PAST WEEK. Below are nine statements which may or may not reflect your behavior and feelings last week.

Respond ONLY to those statements which represent your experience. The following key should be used in responding to such statements:

YES?	- I think that happened but I'm not absolutely sure.
YES	- Yes, that did happen.
YES!	- That <u>really</u> happened.

---

1. I came to class with ideas I wanted to explore.

   YES? ☐ YES ☐ YES! ☐

2. During class I was mentally stimulated.

   YES? ☐ YES ☐ YES! ☐

3. I found myself thinking about class at a later time.

   YES? ☐ YES ☐ YES! ☐

4. I listened with interest to other people's ideas.

   YES? ☐ YES ☐ YES! ☐

5. I wanted to share my ideas with other people in the class.

   YES? ☐ YES ☐ YES! ☐

6. I looked forward to coming to class.

   YES? ☐ YES ☐ YES! ☐

7. I did related readings before coming to class.

   YES? ☐ YES ☐ YES! ☐

8. I used, in a tutoring situation, something I had become aware of in class.

   YES? ☐ YES ☐ YES! ☐

9. I talked about the class to someone.

   YES? ☐ YES ☐ YES! ☐

APPENDIX II

COURSE DESCRIPTION

Learning how students perceive a course is a valuable way by which a teacher can assess how well one's objectives have been met. To gain information about your perceptions of the course, please spend about fifteen minutes responding to the situation described below. The description you write in no way will be used for grading purposes.

> Imagine that another student said to you, "I'll probably have to take your ed. psych. course next semester. Could you tell me what it's been like for you thus far?" How would you respond?

APPENDIX III

INQUIRY FLUENCY TASK

The film you have just seen portrays a teacher's difficulties with students in her class. You are asked to plan a discussion of the film for the rest of your Ed. Psych. class by answering the questions on the following pages.

YOU MAY SPEND AS MUCH TIME RESPONDING TO EACH QUESTION AS YOU WOULD LIKE. ALSO, YOU SHOULD FEEL FREE TO RESPOND TO THEM IN ANY ORDER YOU WISH AND TO IGNORE ANY QUESTION.

I. What specific events or incidents in the film might be worthwhile to discuss?

II. What general problems or issues do you think are raised by the film?

III. What literature do you think might be helpful in the discussion of the film? In what way?

IV. What useful points or ideas could you suggest to the teacher in this film?

APPENDIX IV

INQUIRY RESOLUTION TASK

The purpose of this task is to involve you in an inquiry into the teaching process. The task has two parts.

Part I: Design a learning unit, a set of materials, or a lesson plan (for any subject matter) which is more open ended than the approach generally used. Present your design briefly (outline form is o.k.).

Part II: Provide a rationale for your design with references to the resource materials, readings, and class activities in this content area.

Suggested length: four pages